REMARKS

This is the first office action. Claims 1-34 are pending with this paper. Claims 1-33 are rejected by the Office Action. The Applicant is adding claim 34.

Clarifying Amendments

The Applicant has amended claims 6, 7, 8, 18, 19, 28, and 31 by modifying "tolerable multipath delay" to "predetermined multipath delay" in order to clarify what is being claimed. The amendments are supported by the specification as originally filed. For example, the patent application discloses (Page 16, lines 11-15):

> In the present invention, equalizer 254 provides a second layer of error reduction by providing compensation for excessive multipath delay, that is, for delay in excess of a tolerable multipath delay such as a length of the cyclic prefix, which excessive delay is introduced into the received signal by the propagation environment and by receive side 262 of the communication device prior to the equalizer.

35 USC §102

Claims 1-11 are rejected by the Office Action under 102(e) as being anticipated by U.S. Patent No. 6,618,480. The Applicant respectfully submits that Polley does not teach all the features of independent claim 1. For example, claim 1 includes the feature of "determining, by a first communication device of the plurality of communication devices, an equalization function that reduces a **multipath delay** of the received signal". (Emphasis added.) Polley does not teach this feature. While the specification does not provide an explicit definition of "multipath delay", "multipath delay" refers to "multiple routes taken by RF energy between the transmitter and the receiver" that may occur over a wireless communications channel. (Newton's Telecom Dictionary, 16th Edition, Telecom Books.) Polley merely teaches echo cancellation on a telephone line. For example, Polley discloses (Column 3, lines 23-35. Emphasis added.):

> Because the transmitter and receiver are co-located in the same transceiver of a wireline modem, the receiver portion can exploit knowledge of the transmitted signal to extract the reflected portion of it from the receive path. **Algorithmic echo cancellation techniques can be applied to first estimate the hybrid echo path, synthesize a cancellation signal based on the transmitted signal and an estimate of the hybrid echo path**, and then subtract the cancellation signal from the received signal to alleviate interference. Because the transmitter and receiver

> operate simultaneously and occupy the full bandwidth for the entire time duration, echo cancellation systems are superior because they provide a higher theoretical capacity for transmitting data.

Polley merely teaches echo cancellation in which only one transmission path exists between a transmitter and a receiver through a telephone line (e.g., twisted pair phone line 14 as shown in figs. 1, 2, and 3 and twisted pair phone line 19 as shown in figs. 5 and 6). Thus, Polley does not teach or even suggest the feature of "determining, by a first communication device of the plurality of communication devices, an equalization function that reduces a **multipath delay** of the received signal".

Regarding claim 1, the Office Action further alleges that Polley teaches the features of "receiving, by a second communication device of the plurality of communication devices, subcarrier suppression information" and "suppressing, by the second communication device, an orthogonal subcarrier of the plurality of orthogonal subcarriers based on the received subcarrier suppression information to produce a suppressed subcarrier and a non-suppressed subcarrier". For example, Polley discloses (Column 1, lines 37-41.):

> To support simultaneous communication in both directions (full-duplex operation), some method of separating the received signal from the transmitted signal must be employed so that a transmitter 16 and receiver 18 in each modem 10, 12 can operate simultaneously.

Referring to element 12 in fig. 1 of Polley, Polley merely discloses full duplex operation for a telephone line in which a transmit signal uses a different portion of the frequency spectrum than the received signal. However, Polley does <u>not</u> teach about suppression information for disabling either the transmit frequency spectrum or the receive frequency spectrum in the FDD system. As cited by the Office Action, Polley also discloses (Column 4, lines 10-20):

> The total ADC input is the superposition of the received signal and the echo of the transmitted signal that is reflected back through hybrid 24. The ADC output is a digital representation of the superimposed inputs. The ADC output is passed through a time-domain equalizer 48 and the cyclic prefix is removed at 49. A combination of time and frequency domain techniques are used to remove the echo from this signal. A circular echo synthesizer (CES) 50 is used to make the echo appear periodic so that it can be canceled in the frequency domain at 51.

and further discloses (Column 4, lines 30-39.):

> Thus, CES 50 serves to make the convolution of the transmitted signal and the cyclic-looking hybrid echo path appear circular. A frequency-domain estimate of the CES-enhanced echo is synthesized by multiplying the frequency-domain representation of the transmitted signal at 52 by a frequency-domain estimate H[k] of the hybrid echo path. The synthesized echo is then subtracted at 53 from the frequency-domain representation of the CES enhanced signal at the output of fast Fourier transform (FFT) operation 54.

In the above teachings, Polley teaches removing the cyclic prefix and not suppressing a subcarrier. Also, while Polley discloses a hybrid time/frequency based echo cancellation system that operates with a discrete multitone receiver, Polley does not teach or even suggest suppressing subcarriers. For at least the above reasons, claim 1 is not anticipated by Polley.

Because claims 2-11 ultimately depend from claim 1, claims 2-11 are not anticipated by Polley for at least the above reasons. The Applicant requests reconsideration of claim 1-11.

Claims 12-15 are rejected by the Office Action under 35 USC 102(e) as being anticipated by U.S. Patent No. 5,726,978 (Frodigh). The Applicant has amended claim 12 to include the feature of "utilizing a guard band interval to ameliorate intersymbol interference". The specification, as originally filed supports the amendment. For example, the present patent application discloses cyclic prefix adder 214 and cyclic prefix remover 224 as shown in Fig. 2 of the present patent application. Frodigh does not teach or even suggest this feature, and thus Frodigh does not anticipate claim 12. Moreover, claims 13-15 ultimately depend from claim 12 and are not anticipated by Frodigh for at least the above reasons. The Applicant requests reconsideration of claims 12-15.

Claims 16-22 are rejected by the Office Action under 35 USC 102(e) as being anticipated by Polley. Claim 16 includes the feature of "determining an equalization function that is capable of reducing **a multipath delay** of a received signal that comprises a plurality of orthogonal subcarriers". (Emphasis added.) Polley does not teach this feature. As previously discussed for claim 1, Polley merely teaches echo cancellation on a telephone line and does not even consider multipath delays. Moreover, claims 17-22 depend from claim 16 and are not anticipated for at least the above reasons. The Applicant requests reconsideration of claims 16-22.

Claims 23-33 are rejected by the Office Action under 35 USC 102(e) as being anticipated by Frodigh. The Applicant has amended claim 23 to include "a signal processing unit coupled to

the receiver that receives the plurality of orthogonal subcarriers from the receiver, determines a signal quality metric for each subcarrier of the plurality of orthogonal subcarriers, determines subcarrier suppression information based on the determined signal quality metrics, and **removes a guard band interval".** (Emphasis added.) This feature is not anticipated by Frodigh for similar reasons as discussed for claim 12. Moreover, claims 24-25 depend from claim 23 and are not anticipated for at least the above reasons. The Applicant requests reconsideration of claims 23-25.

Similarly, as with claims 12 and 23, the Applicant has amended claim 26 to include "a transmitter coupled to the signal processing unit that transmits the modulated non-suppressed orthogonal subcarrier and that **inserts a guard band interval to ameliorate intersymbol interference**". (Emphasis added.) Frodigh does not teach this feature. Claim 27 depends from claim 26 and is not anticipated for at least the above reasons. The Applicant requests reconsideration of claims 26-27.

Claim 28 includes "a signal processing unit coupled to the receiver that determines a transfer function corresponding to the communication channel, determines an equalization function that is based on a determined communication channel transfer function and that reduces the multipath delay when the multipath delay exceeds a predetermined multipath delay, and processes the signal based on the determined equalization function". Frodigh does not teach this feature. The Office Action fails to discuss this feature and thus does not show any teaching. Moreover, the Applicant cannot find any teaching in Frodigh that even discusses equalization. The Applicant requests that a specific teaching in Frodigh be shown that teaches this feature. Claims 29-33 depend from claim and are not anticipated for at least the above reasons. The Applicant requests reconsideration of claims 28-33.

CONCLUSIONS

The Applicant is adding claim 34, which is supported by the specification as originally filed. Favorable reconsideration of this application is respectfully requested. The Examiner is invited to contact the undersigned should it be deemed necessary to facilitate prosecution of the application.

Respectfully submitted,

Date: September 8, 2004

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